

REMARKS

Claims 1-22 are pending in this Reissue application, with Claims 4-22 added. Claims 4-8, 10-16, and 18-22 are presented as new claims in this amendment, but are identical to the corresponding claims (i.e., 4-8, 10-16, and 18-22) previously considered and referenced in the Office Action dated March 4, 2002. Claims 9 and 17, which are also provided as new claims in this amendment, are changed from the version of the corresponding claims (i.e., 9 and 17) previously considered, and referenced in the Office Action dated March 4, 2002. Claims 9 and 17 have been redrafted to further clarify aspects of the present invention. The Applicant respectfully requests reconsideration and review of the reissue application in view of the amendments and the following remarks. By the foregoing amendments, no new matter has been added.

Before addressing the merits of the rejection based on prior art, a brief description of the present application is provided. The present application discloses a shield (or heat sink) for use with a hard disk drive containing a heat emitting motor. Specifically, the shield is used to dissipate heat from the hard disk drive (or more particularly the heat emitting motor within the disk drive) to the atmosphere. The shield is formed from a thermally conductive material and includes a plate and a plurality of louvered fins. The plate is physically connected to the hard disk drive for the purpose of conducting heat from the hard disk drive into the plate, and thus into the louvers. The heat in the plate and the louvers is then dissipated (i.e., radiated) into the atmosphere. The louvered fins facilitate the dissipation, or radiation, by increasing the surface area of the shield that is exposed to the atmosphere. Claims 9 and 17 have been redrafted to further clarify these aspects of the invention.

The Examiner rejected Claims 1-22 under 35 U.S.C § 103(a) as being unpatentable over Skutt et al. (U.S. Pat. No. 5,734,149) in view of Wilens (U.S. Pat. No. 4,605,058). This rejection is respectfully traversed.

Skutt et al. ("Skutt") is directed to a kiln assembly including an electric heater and

a hinged control box for controlling the heat (i.e., temperature and duration) provided by the electric heater. Specifically, electronic controls 86 and relays/transformers 88 are attached to the front side 58 of the hinged control box 36 for controlling the heat that is provided by the electric heater. See Figure 4 and col. 4, lines 49-56. Skutt discloses three ways to thermally insulate the controls (i.e., 86, 88) that are on the front side 58 of the control box 36.

First, as shown in Figures 6 and 7, the only direct physical connection between the control box 36 and the heated kiln is a latch (i.e., closure device 60) and a hinge (i.e., pin/receptacle 30, 38). See col. 4, lines 17-21. This not only minimizes the amount of heat that can be conducted into the control box 36, but it creates a "chimney" 134 between the control box 36 and the kiln for circulating warm air away from the control box 36. See Figure 6 and col. 6, lines 5-12. Second, as shown in Figure 4, a thermally insulated baffle 68, which includes a metal plate 70 and fiber insulation 72, is provided inside the control box 36, between the front side 58 of the control box 36 (where the electronics are housed) and the kiln. The fiber insulation 72 insulates the air within chamber 80 (which is created by the insulating baffle 68) from the warm air surrounding the kiln. See Figure 5; and col. 4, lines 25-35.

Finally, as shown in Figure 4, air vents (i.e., openings) 102, 108 are formed in the top and bottom of the control box 36 through the use of louvers 100, 106. By angling the bottom louvers (i.e., 106) away from the kiln, cool air (indicated at arrows 110, 82, and 104) is allowed to circulate up through the insulated chamber (or "chimney") 80. See col. 4, lines 35-39; and col. 5, lines 20-33. From this it is clear that Skutt discloses a control box for housing electronics, and thermally protecting those electronics by (1) insulating the control box from the kiln (by minimizing the control box's connection to the kiln) (2) insulating the air surrounding the electronics from the air surrounding the kiln (by using fiber insulation material to create an insulated chamber), and (3) allowing cool air to circulate up through the insulated chamber (by using air vents created by louvers, and angling the bottom louvers away from the kiln).

Wilens is directed to a springy metal retainer 10 (in the shape of a "W") for holding a flat, rectangular solid state package of electronic components 25 (e.g., transistors, capacitors, or resistors). See col. 1, lines 8-11; and col. 2, lines 53-60. Specifically, the metal retainer 10 includes tabs or tongues 28 for mounting the retainer 10 on a circuit board, and is constructed to dissipate heat from a heat generating electronic component 25. See Figure 2; col. 1, lines 43-47; and col. 2, lines 31-37.

The Examiner asserted that Claims 1-22 were obvious over Skutt in view of Wilens, in that Skutt discloses "a shield 58 comprising [a] rectangular plate with a plurality of louvers" and Wilens discloses "a shield attached to a heat generating device 25." The primary flaw in this argument is that there is no motivation or teaching to combine Skutt with Wilens. See Karsten Mfg. Corp. v. Cleveland Golf Co., 242 F.3d 1376, 1385 (Fed. Cir. 2001) ("In holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would lead a person of ordinary skill in the art to select the references and combine them in a way that would produce the claimed invention."). Skutt discloses the use of louvers to create air vents (similar to the air vents found in a house) for directing air into, and out of, an insulated chamber (like an air duct). There is no disclosure in Skutt that would motivate or teach a "person of ordinary skill in the art" to take an air vent, which is used for directing air in an open-aired chamber, and physically attach it to a heat generating device (i.e., a hard disk drive) for the purpose of dissipating heat from that device (i.e., to act as a heat sink).

This lack of motivation or teaching to combine is further evident from the purpose of the louvers in Skutt. Skutt discloses the use of louvers to create air vents (as opposed to just cutting holes in the control box) because the louvers can be angled to direct the flow of air. Specifically, the bottom louvers are angled away from the kiln to direct cool air (i.e., the air away from the kiln) to flow through the insulated chamber. See col. 5, lines 30-33. Thus, the purpose of the louvers in Skutt is to direct the flow of air. In contradistinction, the louvers in the present application are used to facilitate heat

dissipation by increasing the surface area of the shield that is exposed to the atmosphere. Specifically, the shield in the present invention is designed to dissipate heat from a hard disk drive into the atmosphere. The louvers facilitate the dissipation of heat by increasing the surface area of the shield that is exposed to the atmosphere. This dissimilar use of the louvers in the Skutt reference is further evidence that there is no motivation or teaching to combine Skutt with Wilens (i.e., a heat dissipating reference).

In fact, Skutt actually teaches away from using the air vent as a heat dissipater. Skutt discloses a control box that is designed to be insulated from a heat generating device (as opposed to a heat sink). The main objective of Skutt is to create a control box for a kiln that is kept cool, in part, by not conducting heat from the kiln. According to the specification, the control box is only connected to the kiln through hinges and a clasp, which minimizes the "direct thermal contact" with the kiln, and creates a large air space, or "chimney" between the control box and the kiln. See Figures 6 and 7; col. 4, lines 17-22; and col. 6, lines 5-12. This is the complete opposite of the present invention, which provides direct physical contact between a shield (i.e., a plate and louvers) and a hard disk drive for the purpose of dissipating heat from the hard disk drive. Thus, it is clear that Skutt actually teaches away from using louvered air vents to dissipate heat from a heat generating device, such as a hard disk drive.

Because there is no motivation or teaching to combine Skutt and Wilens, and because Skutt and Wilens, either alone or in combination, fail to disclose the use of louvers (as described in the present application) to "dissipate heat to the atmosphere" as required by Claim 1, or "dissipate heat from said plate" as required by Claims 4 and 9, the rejection of independent Claims 1, 4, and 9, as well as Claims 2-3, 5-8, and 10-16, which depend from the aforementioned independent claims, respectively, should be withdrawn.

Furthermore, because neither reference discloses a "computer storage system comprising: a hard disk drive having a heat emitting motor; and a shield attached to

said hard disk drive, said shield comprising: a plate ... ; and a plurality of louvers provided in said plate and adapted to dissipate heat from said plate," the rejection of independent Claim 17, as well as Claims 18-22, which depend therefrom, should be withdrawn.

In view of the foregoing, the Applicant respectfully submits that Claims 1-22 are in condition for allowance. Reconsideration and withdrawal of the rejections is respectfully requested, and a timely Notice of Allowability is solicited. To the extent it would be helpful to placing this application in condition for allowance, the Applicant encourages the Examiner to contact the undersigned counsel and conduct a telephonic interview.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

While the Applicant believes that no fees are due in connection with the filing of this paper, the Commissioner is authorized to charge any shortage in the fees, including extension of time fees, to Deposit Account No. 50-0639.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The following new claims have been added:

4. (New) A shield for use with a hard disk drive, said hard disk drive having a heat emitting motor, comprising:

a plate having two spaced apart sides defining a thermal conductive region therebetween;

said plate comprising a plurality of louvers adapted to dissipate heat from said plate, each one of said plurality of louvers comprising a fin slanting upwardly from said plate, each said fin having three primary edges comprising a longitudinal edge having ends spaced inward from said sides and two side edges at said ends substantially perpendicular to said longitudinal edge, said fin having a fourth edge integral with said plate and spaced apart from and substantially parallel to said longitudinal edge, said fourth side interconnecting said side edges, each said fin being connected to said plate and located between said sides.

5. (New) The shield according to Claim 4, wherein said plate further includes a depression located to contact said motor when said plate is attached to said hard disk drive.

6. (New) The shield according to Claim 4, wherein said plate further includes outward-upward slanted end edges.

7. (New) The shield according to Claim 4, wherein said plate further comprises a substantially rectangular shape.

8. (New) The shield according to Claim 4, wherein said fin further comprises a substantially rectangular shape.

9. (New) A shield for use with a hard disk drive having a heat emitting motor, comprising:

a plate comprising a substantially planar surface disposed in a first plane;

and

a plurality of louvers provided in said plate and adapted to dissipate heat from said plate, each of said plurality of louvers comprising a substantially planar surface disposed in a respective second plane that intersects said first plane at a corresponding angle, each of said plurality of louvers further comprising a plurality of side edges including an integral side edge connected to said plate.

10. (New) The shield according to Claim 9, wherein said plate further comprises a substantially rectangular shape having two spaced apart sides defining a thermal conductive region therebetween.

11. (New) The shield according to Claim 10, wherein said plurality of side edges further includes a distal side edge opposite said integral side edge having ends spaced inward from said two spaced apart sides, said distal side edge being substantially parallel to said integral side edge.

12. (New) The shield according to Claim 11, wherein said plurality of side edges further includes two end side edges disposed substantially perpendicular to said distal side edge.

13. (New) The shield according to Claim 9, wherein said respective second planes of said plurality of louvers are substantially parallel to one another.

14. (New) The shield according to Claim 9, further comprising a second plurality of louvers provided in said plate, each of said second plurality of louvers comprising a substantially planar surface disposed in a respective third plane that intersects said first plane at a corresponding angle, each of said second plurality of louvers further comprising a plurality of side edges including an integral side edge connected to said plate.

15. (New) The shield according to Claim 9, wherein said plate further includes a depression oriented to contact said motor when said plate is attached to said hard disk drive.

16. (New) The shield according to Claim 9, wherein said plate further includes two end louvers, each said end louver comprising a substantial planar surface that intersects said first plane at a corresponding angle.

17. (New) A computer storage system comprising:

a hard disk drive having a heat emitting motor; and

a shield attached to said hard disk drive, said shield comprising:

a plate comprising a substantially planar surface disposed in a first plane; and

a plurality of louvers provided in said plate and adapted to dissipate heat from said plate, each of said plurality of louvers comprising a substantially planar surface disposed in a respective second plane that intersects said first plane at a corresponding angle, each of said plurality of louvers further comprising a plurality of side edges including an integral side edge connected to said plate.

18. (New) The storage system according to Claim 17, wherein said plurality of side edges further includes a distal side edge opposite said integral side edge, said distal side edge being substantially parallel to said integral side edge.

19. (New) The storage system according to Claim 18, wherein said plurality of side edges further includes two end side edges disposed substantially perpendicular to said distal side edge.

20. (New) The storage system according to Claim 17, wherein said plate further includes a depression oriented to contact said heat emitting motor when said plate is attached to said hard disk drive.

21. (New) The storage system according to Claim 17, wherein said plate further comprises a substantially rectangular shape.

22. (New) The storage system according to Claim 21, wherein said hard disk drive further comprises a substantially rectangular shape.